Name of the Student:_____
Max. Marks : 20 Marks **Time : 20 Minutes**

Q1.

The espresso machine shown in Figure 27 is an electrical appliance.

(Source: © tanawaty/123RF)

Figure 27

The espresso machine has a steam pipe that can be used to heat milk in a jug, as shown in Figure 28.

(Source: © Wavebreak Media Ltd/123RF)

Figure 28

Steam from the pipe enters the milk, where steam condenses to water.

The steam and hot water heat the milk.

(i) Describe, in terms of energy, how the arrangement and movement of particles in the steam changes as the steam enters the milk, condenses and cools.

(2)

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(ii) The specific heat capacity of milk is 3840 J/kg K.

The specific heat capacity of water is 4200 J/kg K.
The specific latent heat of condensation of steam is 2260 kJ/kg.
The temperature of the steam is 100°C
The mass of steam that condenses is 25 g.
The temperature of the milk rises from 5°C to 65°C.
By considering the transfer of energy from the steam to the milk, calculate the mass of milk that is heated by the steam and hot water.
Use equations from the formula sheet.

(4)

mass of milk = ... kg

(iii) Give **two** reasons why the actual mass of steam needed to heat the milk from 5°C to 65°C is greater than 25 g.

(2)

1 .....

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2 .....

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(Total for question = 8 marks)

Q2.

* This question is about determining the specific heat capacity of aluminium.
An aluminium block is placed in boiling water as shown in Figure 10.

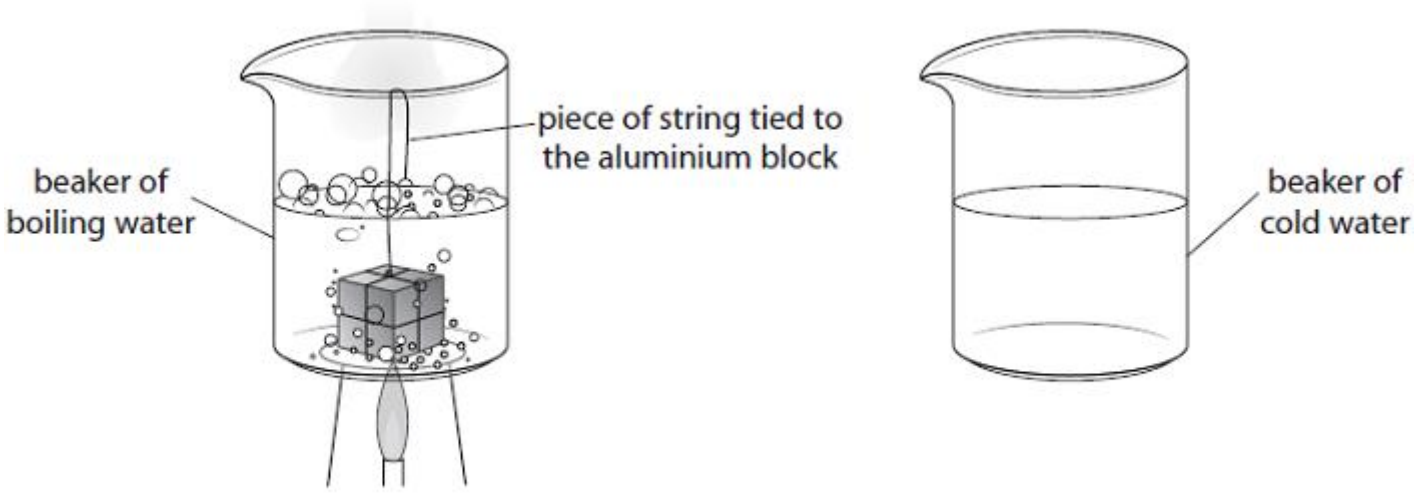

Figure 10

The piece of string is tied to the aluminium block so the block can be transferred from the boiling water to the cold water.

Describe how a student could use this apparatus, and any additional items needed, to determine the specific heat capacity of aluminium.

Your answer should include how the student would

- obtain the necessary measurements
- use the measurements to calculate the specific heat capacity of aluminium.

(6)

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(Total for question = 6 marks)

Q3.

A student measures the density of glass.

The student has

− a bag of marbles, all made from the same type of glass

− a weighing balance

− a plastic measuring cylinder containing water

Describe how the student could find, as accurately as possible, the density of the glass used for the marbles.

(4)

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(Total for question = 4 marks)

Q4.

Describe, in terms of particles, **two** differences between a solid and a liquid of the same substance.

(2)

1 .....

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2 .....

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(Total for question = 2 marks)